MO HASSANPOUR

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Supervised & Unsupervised Machine Learning | Python Programming | Model Evaluation & Optimization | Project Oversight

Aspiring Machine Learning Engineer with a robust track record in healthcare analytics and business intelligence; leads impactful projects in deep learning and deploys advanced machine learning techniques to address complex challenges. Steers the replication and enhancement of state-of-the-art models, achieving significant improvements in prediction accuracy and operational outcomes.

Python Scripting/Programming	Recurrent Neural Networks (RNN)	Healthcare Industry Experience
Database Management & Handling	Software Engineering & System Design	Deep Neural Networks (DNN)
Deep Learning for Healthcare	Data Preprocessing, Mining & Visualization	Convolutional Neural Networks (CNN)

PROFESSIONAL DEVELOPMENT

COURSES:

ML-Applied Machine Learning-Intermediate-NumPy | **ML-Deep Learning For Healthcare-Advanced-PyTorch |**
ML-Practical Statistical Learning-Advanced-R | **ML-Statistical Modeling Intermediate-R** |
Data Visualization - D3.js, javascript, Tableau
Accelerated Computer Science Fundamentals, (CS Fundamentals in C++, Ordered Data Structures, Unordered Data Structures)

Master of Computer Science in Data Science, University of Illinois, Urbana-Champaign	3.3/4.0
Master of Arts in Applied Statistics, University of California, Santa Barbara	3.2/4.0
Bachelor of Arts in Economics, University of California, San Diego	3.5/4.0

TECHNICAL SKILLS:

Programming Languages: Python & R
Tools & Environments: Markdown Notebooks (RStudio Markdown, Jupyter Notebook)
Machine Learning Techniques: Clustering Models, Regression (Regularization: Lasso, Ridge, Elastic Net; GLM; PCA), Neural Networks (Deep Learning), Dimension Reduction, Graphical Models; Classification (Support Vector Machines, K-Nearest Neighbors, Decision Trees, Neural Networks, Logistic Regression, Naive Bayes, Linear/Quadratic Discriminant Analysis)
Business Intelligence Tools: Power BI, Tableau, SQL (MS SQL Server Transact SQL, Teradata), VBA

ACADEMIC PROJECTS

Project 1: Deep Learning for Healthcare   01/2023
    i)   Heart Failure Prediction Enhancement Using CONTENT (Final) Download
Replicated research on predicting hospital readmissions using a unique neural network architecture combining RNNs with latent topic models. Validated the CONTENT model's effectiveness, achieving performance metrics within published ranges on synthetic data for congestive heart failure patient readmission. Enhanced prediction accuracy through deep contextual embedding of clinical concepts, leveraging electronic health records to capture comprehensive document structures. Optimized readmission prevention strategies by identifying at-risk patients with advanced data analysis techniques.

    ii)   Heart Failure Prediction Enhancement Using Advanced Autoencoder Architectures View/Download
Achieved breakthrough in heart failure predictive accuracy by leveraging PyTorch to engineer a suite of autoencoder models (vanilla, sparse, denoised, stacked). Exceeded Performance Benchmarks: Utilized Torchvision for meticulous data preprocessing, enabling the surpassing of rigorous accuracy benchmarks in hidden tests. Employed Variational Autoencoders to create synthetic datasets. Developed and optimized autoencoder architectures to achieve efficiency in data compression and feature extraction.

    iii)   Heart Failure Prediction with RETAIN: An Interpretable RNN Model View/Download
Developed an interpretable predictive model for heart failure using RETAIN, an advanced RNN with a reverse time attention mechanism, achieving high accuracy in predictions using the MIMIC-III synthesized dataset. Implemented dual attention mechanisms for nuanced analysis of patient visits and detailed feature relevance within visits, enhancing model interpretability and predictive precision in healthcare analytics. Pioneered in embedding techniques for healthcare data, transforming diagnosis codes into

meaningful representations for sequential analysis. Crafted a context vector generation technique through weighted averaging of encoder hidden states. Trained and predicted heart failure cases with attention-based RNN, proving the model's efficacy in handling complex medical datasets and contributing to the advancement of interpretable machine learning in healthcare.

iv)   Advanced ECG Classification with MINA: Multilevel Attention-Guided CNN+RNN Model View/Download

Implemented MINA, an advanced CNN+RNN model, for binary classification of ECG signals, distinguishing atrial fibrillation from normal sinus rhythms with high accuracy. Developed a Knowledge-guided Attention Module, integrating three distinct attention mechanisms (Beat Level, Rhythm Level, and Frequency Level) for nuanced signal analysis. Pioneered multilevel attention mechanisms in ECG analysis, leveraging beat, rhythm, and frequency features for signal interpretation. Achieved significant accuracy in binary classification of ECGs, through model training and evaluation, proving the efficacy of MINA in detecting atrial fibrillation.

Project 2: Walmart Sales Forecasting View/Download   09/2022

Enhanced Walmart's sales forecasting through Principal Components Regression and machine learning, improving planning across stores and departments. Optimized data pre-processing for better model accuracy and relevance, focusing on specific forecasting periods. Achieved superior forecasting accuracy, with an average WMAE of 1583.40, by applying innovative training and data reduction methods. Introduced a fold-specific training approach, utilizing historical data for targeted future sales predictions.

Project 3: Movie Review Sentiment Analysis Download   09/2022

Optimized sentiment analysis model by implementing Lasso logistic regression, refining the vocabulary from 50,000 IMDB movie reviews to identify key predictors of sentiment, and enhancing model accuracy and efficiency. Enhanced predictive accuracy for movie review sentiments by creating and refining a Document Term Matrix (DTM) using text preprocessing and vocabulary pruning techniques, leading to a more focused and effective classification model.

Project 4: Movie Recommendation System Report Published Shiny App   09/2022

Developed a system to recommend movies by genre, utilizing two schemes: Highly Rated and Trending. Used the MovieLens 1M Dataset to categorize films based on their ratings and recent popularity. Implemented UBCF by constructing a rating matrix and applying cosine similarity measures. Predicted user preferences and improved the accuracy of suggestions, analyzing the similarities between users' ratings. Developed IBCF by normalizing data and calculating similarities between items. This method optimizes recommendations through a model-based approach.

PROFESSIONAL EXPERIENCE

Data Analyst IV, Centene Corporation   10/2021 – Present

Revolutionized HEDIS reporting by implementing Power BI visualizations with DAX and M queries, eliminating manual processes in Access, Excel, and PowerPoint. Achieved promotion from Business Analyst III to Data Analyst IV due to significant enhancements in reporting and analytics processes. Automated Excel to Power BI report conversion, streamlining efficiency and connecting reports directly to data sources. Enhanced reporting accuracy by integrating Oracle queries into Power BI, improving data analysis. Provided advanced analytical support for Claim Quality and Continuous Improvement using Teradata SQL, managing large data across systems.

Business Analyst III, Centene Corporation   11/2020 – 10/2021

Optimized reporting efficiency using SQL Server, SSIS, and Python, enhancing data analysis and process optimization. Improved patient care metrics by integrating Quality Improvement and HEDIS with advanced analytics. Streamlined documentation with Azure DevOps and markdown. Enhanced data accuracy using SAS and Excel for sophisticated data manipulation, supporting reliable decision-making. Facilitated team collaboration through reporting solutions, promoting cross-functional engagement.

PREVIOUS EXPERIENCE: Data Analyst III, LA Care Health Plan | Healthcare Economics Consultant, Senior Healthcare Economics Analyst, UnitedHealth Group - Optum Insight | Analytic Science - Scientist II (Function: Machine Learning Engineer), FICO | Teaching Assistant, Department of Applied Probability and Statistics, The University of California